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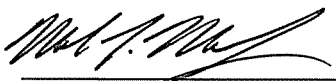
Patent No.	Serial No.	Patent Date	US Filing Date	Confirmation No.	Attorney Docket No.
7,456,037 B2	10/747,864	11/25/2008	12/29/2003	2781	0553-0198.02

Respectfully Submitted,



Mark J. Murphy
Registration No. 34,225
Date: December 11, 2008

COOK ALEX Ltd.
200 West Adams Street
Suite 2850
Chicago, Illinois 60606
(312) 236-8500

Customer No: 26568

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(12) **United States Patent**
Yamazaki

(10) **Patent No.: US 7,456,037 B2**
(45) **Date of Patent: Nov. 25, 2008**

(54) **EL DISPLAY DEVICE AND A METHOD OF MANUFACTURING THE SAME**

(75) Inventor: **Shunpei Yamazaki**, Tokyo (JP)

(73) Assignee: **Semiconductor Energy Laboratory Co., Ltd.** (JP)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 1111 days.

(21) Appl. No.: **10/747,864**

(22) Filed: **Dec. 29, 2003**

(65) **Prior Publication Data**

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Related U.S. Application Data

(60) Continuation of application No. 10/186,956, filed on Jul. 1, 2002, now Pat. No. 6,673,643, which is a division of application No. 09/615,264, filed on Jul. 13, 2000, now Pat. No. 6,432,561.

(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**
H01L 51/40 (2006.01)
H01L 21/00 (2006.01)

(52) **U.S. Cl.** **438/30**; 438/99; 257/E21.352

(58) **Field of Classification Search** 438/30, 438/99; 257/E21.352, E21.053, E21.358
See application file for complete search history.

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Primary Examiner—Scott B. Geyer
Assistant Examiner—Seahvosh J Nikmanesh
(74) *Attorney, Agent, or Firm*—Cook Alex Ltd.

(57) **ABSTRACT**

To decrease the number of layers while keeping or improving the performance of an EL element, so that the production cost is reduced. Cathodes (**106, 107**), a light emitting layer (**108**), an anode (**109**), and a passivation film (**110**) are formed on pixel electrodes (**104, 105**). Thereafter, the vicinity of the interface between the light emitting layer (**108**) and the anode (**109**) are doped with a halogen element through the passivation film (**110**) and the anode (**109**). This leads to formation of a hole conveying region (**111**) that functions as a hole conveying layer, thereby enhancing the light emission efficiency.

15 Claims, 8 Drawing Sheets